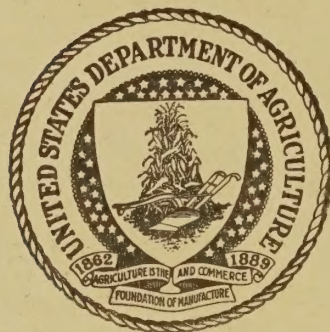


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January 23, 1947

To: All Regional Construction Engineers

From: J. K. O'Shaughnessy, Chief
Engineering Division

Subject: Estimating Cost of Substations

The factors shown below may be used for estimating the increased costs of substations to provide for increases in material costs. The materials in a substation are divided into two classes, viz, transformers and structures. The factors when multiplied by the applicable percent increase in cost of transformers, structures, or both, and by the total cost of the substation will give the dollar amount of the increase.

Factors for Evaluating Cost of Substations (Materials Only)

Base - January 1946

	<u>Wood Substations</u>		<u>Steel Substations</u>	
	<u>3-Transf.</u>	<u>4-Transf.</u>	<u>3-Transf.</u>	<u>4-Transf.</u>
	(1)	(2)	(3)	(4)
Transformers	.00421	.00492	.00367	.00438
Structures	.00389	.00341	.00479	.00425
Total Material	.00810	.00833	.00846	.00863

Base - November 9, 1946

Transformers	.00430	.00502	.00373	.00442
Structures	.00405	.00354	.00495	.00440
Total Material	.00835	.00856	.00868	.00882

The following table gives the percent increase for the material groups in effect as shown:

	As of 11/9/46 over Jan. '46	As of 1/1/47 over Jan. '46	As of 1/15/46 over 11/9/46
	Base	Base	Base
	(1)	(2)	(3)
Transformers	18	25	6
Structures	20	35	12
Total Material	19	30	9

EXAMPLES:

1. Assume a total cost of \$7500, January 1946, base, for a wood substation - 33 KV, 3-200 KVA transformers. To find the November 9th cost:--

The percent increase for total materials from column (1) is 19.
The factor for total materials column (1) is .00810.

- (1) .00810 X 19 X \$7500 = \$1155 material cost increase
(2) 7500 total cost January 1946
\$8655 total cost November 9, 1946,
or 15% increase

2. Assume a total cost of \$21,000, November 9th base, for a steel substation - 66 KV, 4-333 1/3 KVA transformers (1000 KVA substation). To find present day cost for an increase in price of transformers only:--

The percent increase for transformers from column (3) is 6.
The factor for transformers column (4) is .00442.

- (1) .00442 X 6 X \$21,000 = \$557 transformer cost increase
(2) 21,000 total cost November 9th
\$21,557 total cost today or 2.7%
increase

The attached lists of Estimated Substation Costs as of January 1946, and November 9, 1946, will be found useful as a guide in estimating costs of new substations. The values shown are total costs for labor and other, and material.

J. H. C. Strangman

Attachments

ESTIMATED SUBSTATION COSTS

January 1946

KVA	HV - 7200/12,470		LV-2400	
	Wood		Steel	
	Transformers		Transformers	
	3	4	3	4
150	\$2,895	\$3,299	\$3,322	\$3,726
225	3,314	3,779	3,801	4,266
300	3,945	4,498	4,526	5,079
450	4,843	5,522	5,556	6,235
600	5,629	6,419	6,458	7,248
750	6,273	7,153	7,196	8,076
1000	7,494	8,546	8,597	9,649
1500	9,758	11,127	11,193	12,562

KVA	HV - 13,200		LV - 7200/12,470	
	Wood		Steel	
	Transformers		Transformers	
	3	4	3	4
150	\$3,057	\$3,486	\$3,507	\$3,936
225	3,475	3,963	3,986	4,474
300	4,138	4,718	4,747	5,327
450	5,081	5,793	5,828	6,540
600	5,905	6,733	6,774	7,602
750	6,584	7,509	7,553	8,478
1000	7,869	8,973	9,027	10,131
1500	10,245	11,682	11,752	13,189

KVA	HV - 22,000		LV - 7200/12,470	
	Wood		Steel	
	Transformers		Transformers	
	3	4	3	4
150	\$4,280	\$4,881	\$4,910	\$5,511
225	4,983	5,682	5,717	6,416
300	5,577	6,359	6,398	7,180
450	6,349	7,240	7,283	8,174
600	7,211	8,223	8,272	9,284
750	7,914	9,024	9,079	10,189
1000	9,138	10,420	10,482	11,764
1500	11,271	12,852	12,929	14,510

ESTIMATED SUBSTATION COSTS (Cont'd)

January 1946

KVA	HV - 33,000		LV - 7200/12,470	
	Wood		Steel	
	Transformers		Transformers	
	3	4	3	4
150	\$4,907	\$5,595	\$5,629	\$6,317
225	5,577	6,359	6,398	7,180
300	6,195	7,064	7,106	7,975
450	6,974	7,953	8,000	8,979
600	7,760	8,850	8,902	9,992
750	8,473	9,661	9,719	10,907
1000	9,739	11,106	11,172	12,539
1500	11,964	13,642	13,725	15,403

KVA	HV - 44,000		LV - 7200/12,470	
	Wood		Steel	
	Transformers		Transformers	
	3	4	3	4
150	\$6,432	\$7,335	\$7,379	\$8,282
225	7,007	7,990	8,038	9,021
300	7,539	8,597	8,649	9,707
450	8,273	9,434	9,490	10,651
600	9,162	10,447	10,510	11,795
750	9,884	11,271	11,338	12,725
1000	11,159	12,725	12,801	14,367
1500	13,477	15,368	15,460	17,351

KVA	HV - 66,000		LV - 7200/12,470	
	Wood		Steel	
	Transformers		Transformers	
	3	4	3	4
150	\$9,135	\$10,417	\$10,480	\$11,762
225	9,741	11,108	11,174	12,541
300	9,853	11,236	11,302	12,685
450	10,751	12,259	12,332	13,840
600	11,722	13,367	13,447	15,092
750	12,572	14,336	14,422	16,186
1000	13,998	15,962	16,057	18,021
1500	16,418	18,721	18,834	21,137

ESTIMATED SUBSTATION COSTS

November 9, 1946

KVA	HV - 7200/12,470		LV - 2400	
	Wood		Steel	
	Transformers		Transformers	
	3	4	3	4
150	\$3,337	\$3,815	\$3,857	\$4,335
225	3,823	4,371	4,416	4,964
300	4,549	5,202	5,257	5,910
450	5,586	6,387	6,454	7,255
600	6,492	7,424	7,502	8,434
750	7,234	8,272	8,358	9,396
1000	8,643	9,884	9,987	11,228
1500	11,254	12,869	13,002	14,617

KVA	HV - 13,200		LV - 7200/12,470	
	Wood		Steel	
	Transformers		Transformers	
	3	4	3	4
150	\$3,525	\$4,031	\$4,073	\$4,579
225	4,007	4,582	4,630	5,205
300	4,772	5,457	5,514	6,199
450	5,859	6,700	6,769	7,610
600	6,810	7,787	7,869	8,846
750	7,594	8,684	8,775	9,865
1000	9,075	10,377	10,486	11,788
1500	11,815	13,511	13,651	15,347

KVA	HV - 22,000		LV - 7200/12,470	
	Wood		Steel	
	Transformers		Transformers	
	3	4	3	4
150	\$4,936	\$5,645	\$5,703	\$6,412
225	5,747	6,571	6,641	7,465
300	6,432	7,355	7,432	8,355
450	7,322	8,373	8,460	9,511
600	8,317	9,510	9,609	10,802
750	9,127	10,437	10,546	11,856
1000	10,539	12,051	12,176	13,688
1500	12,980	14,864	15,018	16,884

ESTIMATED SUBSTATION COSTS (Cont'd)

November 9, 1946

KVA	HV - 33,000		LV - 7200/12,470	
	Wood		Steel	
	Transformers		Transformers	
	3	4	3	4
150	\$5,659	\$6,471	\$6,538	\$7,350
225	6,432	7,355	7,432	8,355
300	7,144	8,170	8,254	9,280
450	8,044	9,198	9,293	10,447
600	8,951	10,235	10,342	11,626
750	9,771	11,173	11,289	12,691
1000	11,232	12,844	12,977	14,589
1500	13,798	15,778	15,943	17,923

KVA	HV - 44,000		LV - 7200/12,470	
	Wood		Steel	
	Transformers		Transformers	
	3	4	3	4
150	\$7,418	\$8,483	\$8,572	\$9,637
225	8,081	9,240	9,337	10,496
300	8,695	9,943	10,047	11,295
450	9,542	10,911	11,024	12,393
600	10,567	12,083	12,209	13,725
750	11,400	13,036	13,171	14,807
1000	12,870	14,717	14,870	16,717
1500	15,543	17,773	17,959	20,189

KVA	HV - 66,000		LV - 7200/12,470	
	Wood		Steel	
	Transformers		Transformers	
	3	4	3	4
150	\$10,536	\$12,048	\$12,174	\$13,686
225	11,234	12,846	12,979	14,591
300	11,364	12,995	13,129	14,760
450	12,398	14,177	14,324	16,103
600	13,519	15,459	15,620	17,560
750	14,499	16,580	16,753	18,834
1000	16,144	18,461	18,652	20,969
1500	18,934	21,651	21,877	24,594

